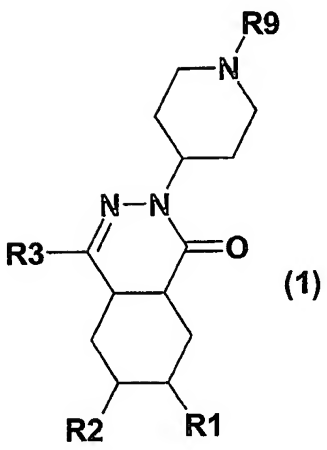
Patent claims

1. Compounds of formula 1

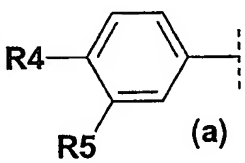


(1)

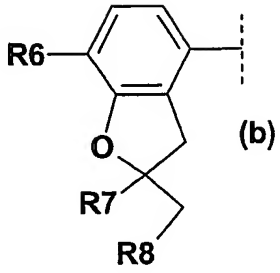
in which

R1 and R2 are both hydrogen or together form an additional bond,

R3 represents a phenyl derivative of formulae (a) or (b)



(a)



(b)

wherein

R4 is 1-4C-alkoxy or 1-4C-alkoxy which is completely or predominantly substituted by fluorine,

R5 is 1-4C-alkoxy, 3-7C-cycloalkoxy, 3-7C-cycloalkylmethoxy, or 1-4C-alkoxy which is completely or predominantly substituted by fluorine,

R6 is 1-4C-alkoxy or 1-4C-alkoxy which is completely or predominantly substituted by fluorine,

R7 is 1-4C-alkyl and

R8 is hydrogen or 1-4C-alkyl,

or wherein

R7 and R8 together and with inclusion of the two carbon atoms, to which they are bonded, form a spiro-linked 5-, 6- or 7-membered hydrocarbon ring, optionally interrupted by an oxygen or sulphur atom,

R9 is $-C(O)-(CH_2)_n-R10$,

wherein

R10 is pyrrolidine-2,5-dione-1-yl,

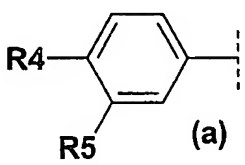
n is an integer from 1 to 4,

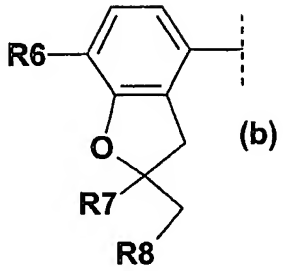
and the salts of these compounds.

2. Compounds of formula 1 according to claim 1 in which

R1 and R2 are both hydrogen or together form an additional bond,

R3 represents a phenyl derivative of formulae (a) or (b)





wherein

R4 is 1-2C-alkoxy or 1-2C-alkoxy which is completely or predominantly substituted by fluorine,

R5 is 1-2C-alkoxy or 1-2C-alkoxy which is completely or predominantly substituted by fluorine,

R6 is 1-2C-alkoxy or 1-2C-alkoxy which is completely or predominantly substituted by fluorine,

R7 is methyl and

R8 is hydrogen,

or wherein

R7 and R8 together and with inclusion of the two carbon atoms, to which they are bonded, form a spiro-linked cyclopentane, cyclohexane, tetrahydrofurane or tetrahydropyran ring,

R9 is $-C(O)-(CH_2)_n-R10$,

wherein

R10 is pyrrolidine-2,5-dione-1-yl and

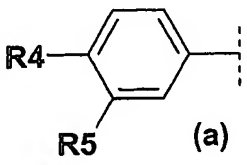
n is an integer from 1 to 2,

and the salts of these compounds.

3. Compounds of formula 1 according to claim 1 in which

R1 and R2 together form an additional bond,

R3 represents a phenyl derivative of formula (a)



wherein

R4 is 1-2C-alkoxy,

R5 is 1-2C-alkoxy,

R9 is -C(O)-$(CH_2)_n$-R10,

wherein

R10 is pyrrolidine-2,5-dione-1-yl and

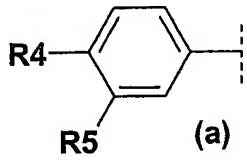
n is 1,

and the salts of these compounds.

4. Compounds of formula 1 according to claim 1 in which

R1 and R2 together form an additional bond,

R3 represents a phenyl derivative of formula (a)



wherein

R4 is methoxy,

R5 is methoxy,

R9 is -C(O)-$(CH_2)_n$-R10,

wherein

R10 is pyrrolidine-2,5-dione-1-yl and

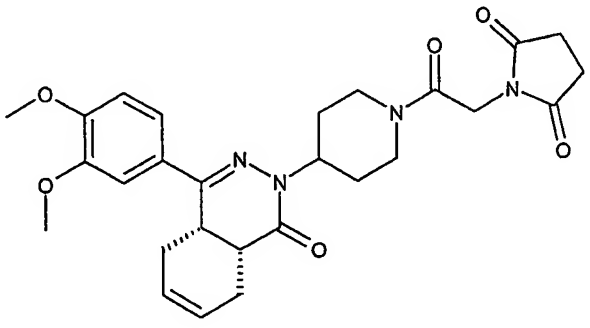
n is 1,

and the salts of these compounds.

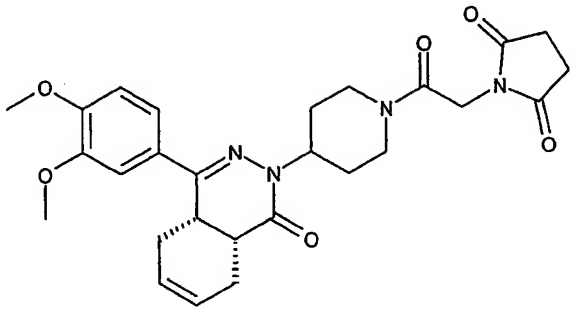
5. Compounds of formula 1 according to any of the claims 1 to 4, in which the hydrogen atoms in the positions 4a and 8a are cis configurated.

6. Compounds of formula 1 according to any of the claims 1 to 4, in which the absolute configuration is S in the position 4a and R in the position 8a.

7. A compound of formula 1 according to claim 1 with the chemical formula



8. A compound of formula 1 according to claim 1 with the chemical formula



and the salts of this compound.

9. A compound of formula 1 according to claim 1 with the chemical name 1-(2-{4-[(4aS,8aR)-4-(3,4-Dimethoxy-phenyl)-1-oxo-4a,5,8,8a-tetrahydro-1H-phthalazin-2-yl]-piperidin-1-yl}-2-oxo-ethyl)-pyrrolidine-2,5-dione.

10. A compound of formula 1 according to claim 1 with the chemical name 1-(2-{4-[(4aS,8aR)-4-(3,4-Dimethoxy-phenyl)-1-oxo-4a,5,8,8a-tetrahydro-1H-phthalazin-2-yl]-piperidin-1-yl}-2-oxo-ethyl)-pyrrolidine-2,5-dione and the salts of this compound.

11. Compound obtainable by the reaction of (4aS,8aR)-4-(3,4-Dimethoxy-phenyl)-2-piperidin-4-yl-4a,5,8,8a-tetrahydro-2H-phthalazin-1-one hydrochloride with 1-(2-chloro-ethanoyl)-pyrrolidine-2,5-dione in the presence of a base.

12. 1-(2-{4-[(4aS,8aR)-4-(3,4-Dimethoxy-phenyl)-1-oxo-4a,5,8,8a-tetrahydro-1H-phthalazin-2-yl]-piperidin-1-yl}-2-oxo-ethyl)-pyrrolidine-2,5-dione obtainable by the reaction of (4aS,8aR)-4-(3,4-Dimethoxy-phenyl)-2-piperidin-4-yl-4a,5,8,8a-tetrahydro-2H-phthalazin-1-one hydrochloride with 1-(2-chloro-ethanoyl)-pyrrolidine-2,5-dione in the presence of a base.

13. Compounds of formula 1 according to claim 1 for the treatment of diseases.

14. Pharmaceutical compositions containing one or more compounds of formula 1 according to claim 1 together with the usual pharmaceutical auxiliaries and/or carrier materials.

15. Use of compounds of formula 1 according to claim 1 for the preparation of pharmaceutical compositions for the treatment of an illness treatable by the administration of a PDE4 inhibitor.

16. Use of compounds of formula 1 according to claim 1 for the preparation of pharmaceutical compositions for the treatment of airway disorders.

17. A method for treating a disease treatable by the administration of a PDE4 inhibitor in a patient comprising administering to said patient in need thereof a therapeutically effective amount of a compound of formula 1 as claimed in claim 1.

18. A method for treating airway disorders in a patient comprising administering to said patient a therapeutically effective amount of a compound of formula 1 as claimed in claim 1.